

metallic circuit are assumed to be always perfectly balanced, it is also assumed that the contact effects of the electrolytes or interposed fluid with the metals are not balanced, but are so far removed from anything like an equilibrium, as to produce most powerful currents, even the strongest that a voltaic pile can produce. If so, then why should the solution of sulphuret of potassium be an exception? it is quite unlike the metals: it does not appear to conduct without decomposition; it is an excellent electrolyte, and an excellent *exciting* electrolyte in proper cases (868), producing most powerful currents when it acts chemically; it is in all these points quite unlike the metals, and, in its action, like any of the acid or saline exciting electrolytes commonly used. How then can it be allowed that, without a single direct experiment, and solely for the purpose of avoiding the force of those which are placed in opposition, we should suppose it to leave its own station amongst the electrolytes, and class with the metals; and that too, in a point of character, which, even with them, is as yet a mere assumption (797)?

850. But it is not with the sulphuret of potassium alone that this freedom must be allowed; it must be extended to the nitrous acid (831, 835), to the nitric acid (837, etc.), and even to the solution of potash (842); all these being of the class of electrolytes, and yet exhibiting no current in circuits where they do not occasion chemical action. Further, this exception must be made for *weak solutions* of sulphuret of potassium (830) and of potassa (844), for they exhibit the same phenomena as the stronger solutions. And if the contact theorists claim it for these weak solutions, then how will they meet the case of weak nitric acid which is not similar in its action on iron to strong nitric acid (965), but can produce a powerful current?

851. The chemical philosopher is embarrassed by none of these difficulties; for he first, by a simple direct experiment, ascertains whether any of the two given substances in the circuit are active chemically on each other. If they are, he expects and finds the corresponding current; if they are not, he expects and he finds no current, though the circuit be a

good conductor and he look carefully for it (817).
852. Again; taking the case of iron, platina,
and solution
of sulphuret of potassium, there is no current;
but for iron
substitute zinc, and there is a powerful current.
I might for
zinc substitute copper, silver, tin, cadmium,
bismuth, lead, and
other metals; but I take zinc, because its
sulphuret dissolves